

Directed Numbers

Solutions



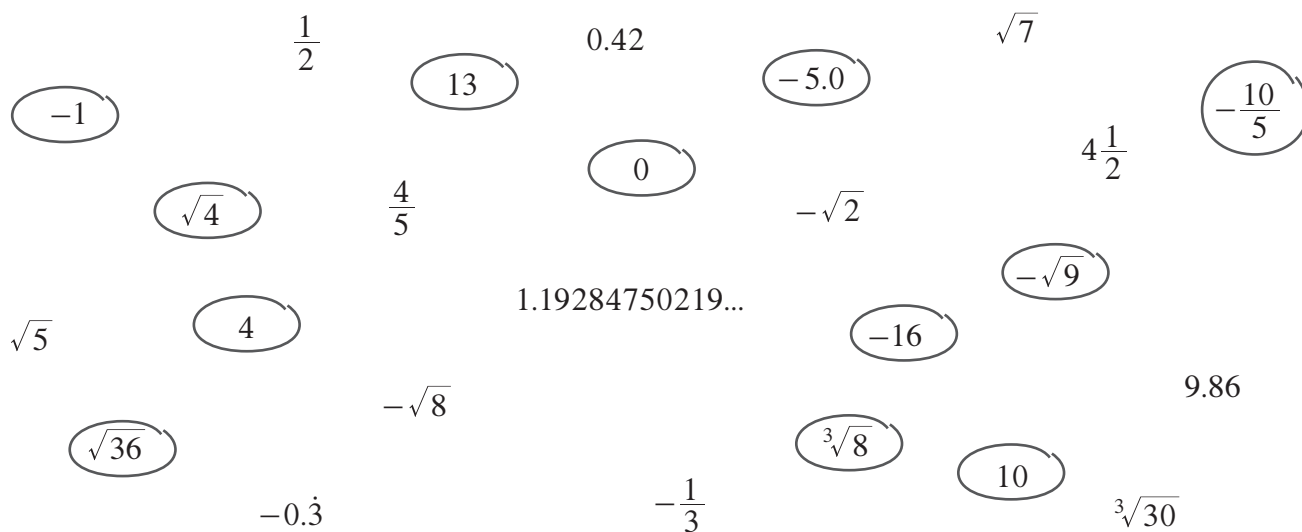
Curriculum Ready



www.mathletics.com

Page 2 questions

Types of Numbers



Irrational numbers can't be written as a fraction

 $-\sqrt{2}$ $\sqrt{7}$ $\sqrt[3]{30}$ $-\sqrt{8}$ $\sqrt{5}$ $1.19284750219\dots$

Rational numbers can be written as a fraction

 $\frac{1}{2}$ 9.86 $4\frac{1}{2}$ $-\frac{1}{3}$ -0.3 0.42 $\frac{4}{5}$
Integers: the positive and negative **whole** rational numbers including 0.
 -1 -16 -5.0 $-\sqrt{9}$ $-\frac{10}{5}$ 0

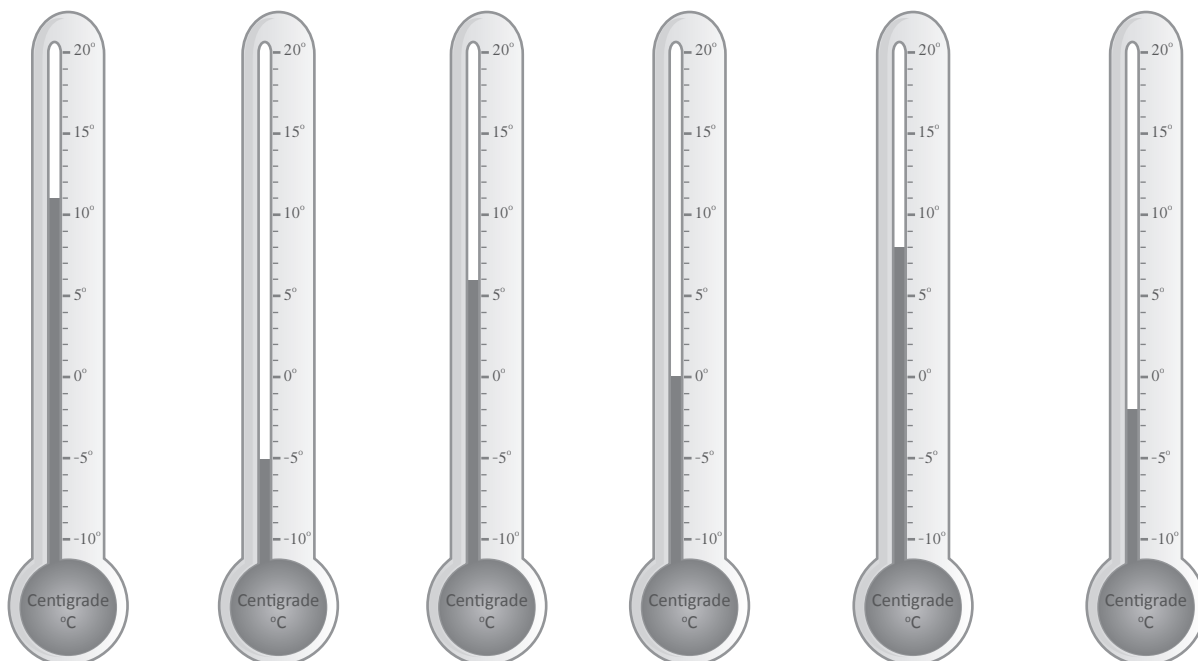
Natural numbers: the counting rational numbers (not including 0).

 4 13 $\sqrt{36}$ 10 $\sqrt[3]{8}$ $\sqrt{4}$

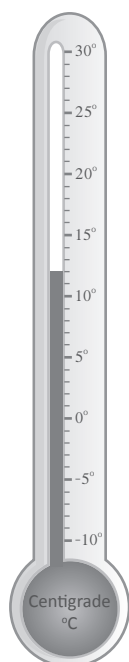
Page 4 questions

Measuring instruments and integers

- 1 (i) 11°C (ii) -5°C (iii) 6°C (iv) 0°C (v) 8°C above zero (vi) 2°C below zero



2



- (i) Increases by 3°C
- (ii) Becomes 8°C cooler
- (iii) Decreases by 13°C
- (iv) Warms up by 9°C
- (v) Rose by 22°C
- (vi) Dropped 28°C
- (vii) Decrease by 7°C then increase by 12°C
- (viii) Warms by 3°C and then a further 9°C
- (ix) Cools 15°C before warming by 19°C
- (x) Changes to 0°C before dropping 4°C

- 12 $^{\circ}\text{C}$
- 15 $^{\circ}\text{C}$
- 7 $^{\circ}\text{C}$
- 6 $^{\circ}\text{C}$
- 3 $^{\circ}\text{C}$
- 25 $^{\circ}\text{C}$
- 3 $^{\circ}\text{C}$
- 2 $^{\circ}\text{C}$
- 14 $^{\circ}\text{C}$
- 18 $^{\circ}\text{C}$
- 4 $^{\circ}\text{C}$

Page 5 questions

Measuring instruments and integers

- 3 (i) $402 + 320$ 722 grams
- (ii) $402 - 212$ 190 grams
- (iii) $402 + 88 - 250$ 240 grams
- (iv) $402 + 402$ 804 grams
- (v) $402 + 216 - 7$ 611 grams

- 4 Change in room temperature = $32 - 24 = 8$

\therefore Total number of 2° rises in room temperature = $8 \div 2 = 4$

\therefore Total number of water collected through condensation = $4 \times 3 = 12$

\therefore 12g condensation – 24g spilt = -12g

\therefore Original mass of water = $583 - 12 = 571\text{ grams}$

Page 7 questions

Magnitude and direction of integers

- | | | | |
|--------------------------|--|--|---|
| 1 a (i) Directed number: | +3 m | (ii) Magnitude of the tree's growth: | 3 m |
| (iii) Directed number: | -4 m | (iv) Magnitude of the reduction in height: | 4 m |
| b (i) Directed number: | -250 m | (ii) Magnitude of the distance Aki walked: | 250 m |
| (iii) Directed number: | +600 m | (iv) Magnitude of this distance walked by Aki: | 600 m |
| c (i) Directed number: | +\$4 | (ii) Magnitude of Sean's bank balance increase: | \$4 |
| (iii) Directed number: | -\$3 | (iv) Magnitude of the change in Sean's bank balance: | \$3 |

Page 7 questions

Magnitude and direction of integers

- 2 a After spending \$15, Pip is left with $\$24 - \$15 = \$9$

\therefore the overall change in money for Pip on this day is:

+\$9

The final **directed value** = overall change

- b Total increase in temperature is $6^\circ + 4^\circ = 10^\circ$

\therefore the overall change in temperature:

+10°

The final **directed value** = overall change

- c Change in ladder rungs is 6 rungs down + 2 rungs up = 4 rungs down.

\therefore the overall change in ladder rungs is:

−4 rungs

(or 4 rungs down)

The final **directed value** = overall change

- d Cameron's coolness change is 4 points + 20 points = 24 points.

\therefore the overall change in Cameron's coolness is:

+24 points

The final **directed value** = overall change

- e Shiromee's North/ South change is 12km North and 19km South which leaves her 7km South.

\therefore the overall North/ South change in Shiromee's position is:

−7km

The final **directed value** = overall change

- f Adele's hair length initially grew $30\text{cm} - 20\text{cm} = 10\text{cm}$ (+ 10cm)

The amount of hair cut off is the length before the hair cut - length after the hair cut.

$$\therefore 30\text{cm} - 17\text{cm} = 13\text{cm} \text{ (} - 13\text{cm)}$$

\therefore Adele has 3cm less hair than when she started at 20cm.

−3cm

The final **directed value** = overall change

Page 9 questions

Ascending and descending order

1 Circle the word that represents the order of the values in these statements:

- | | | | |
|---|----------------------|-----------|------------|
| a | Shortest to Tallest | Ascending | Descending |
| b | Longest to shortest | Ascending | Descending |
| c | Closest to farthest | Ascending | Descending |
| d | Warmest to Coolest | Ascending | Descending |
| e | Heaviest to lightest | Ascending | Descending |
| f | Thinnest to widest | Ascending | Descending |

2 Arrange the following groups of numbers into **ascending** order (lowest to highest).

- a 0 , 3 , 14 , 17 _____
- b 19 , 20 , 21 , 22 , 25 _____
- c -16 , -12 , -10 , -8 , -4 _____
- d -2.6 , -2 , 0 , 2.2 , 2.4 _____
- e -1.5 , -1 , $\frac{1}{5}$, $\frac{1}{4}$, 1 , 11 _____

3 Arrange the following groups of numbers into **descending** order (highest to lowest).

- a 16 , 8 , 5 , 2 _____
- b 40 , 38 , 32 , 31 , 29 _____
- c -11 , -13 , -16 , -18 , -19 _____
- d 1.9 , 1.6 , 1.2 , -1.0 , -1.2 _____
- e 1.2 , 0 , $-\frac{1}{4}$, -2.1 , $-2\frac{1}{2}$, -30 _____

Page 10 questions

Ascending and descending order

Combo Time!

4 a Start = 3rd floor

Floor and associated directed movement

- ☐ 12th floor = +9 floors
- ☐ 8th floor = -4 floors
- ☐ Ground floor = -8 floors
- ☐ 2nd floor = +2 floors
- ☐ Ground floor = -2 floors
- ☐ 15th floor = +15 floors
- ☐ 4th floor = -11 floors
- ☐ 10th floor = +6 floors
- ☐ 5th floor = -5 floors

+9, -4, -8, +2, -2, +15, -11, +6, -5

b +15, +9, +6, +2, -2, -4, -5, -7, -11

c Total ascending = $15 + 9 + 6 + 2 = 32$ floors up (+ 32)

Total descending = $2 + 4 + 5 + 8 + 11 =$ floors down (- 30)

∴ the operator mostly ascended in the first 15 minutes as the total floors travelled ascending are 2 more than the total floors travelled descending.

Another simple way to work this out is comparing the starting floor level with the finishing floor level.

Started on 3rd floor

Finished on 5th floor

∴ finished 2 floors above where started, so more floors travelled ascending.

Page 12 questions

The Number Line

1 Insert the correct symbol $<$ (less than) or $>$ (greater than) for each of these.

a $6 \boxed{>} 4$

b $3 \boxed{>} -12$

c $-5 \boxed{<} 4$

d $-11 \boxed{<} -2$

e $8 \boxed{>} -8$

f $-7\frac{1}{2} \boxed{<} -7$

g $-\frac{1}{2} \boxed{<} 0$

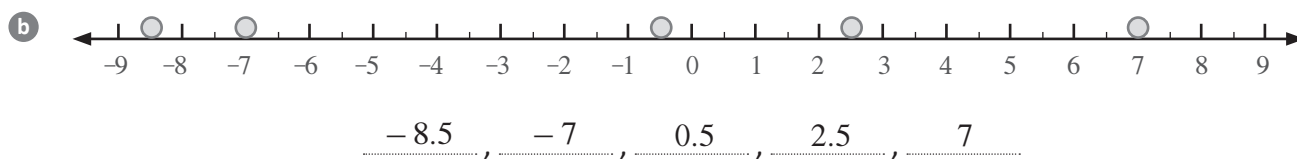
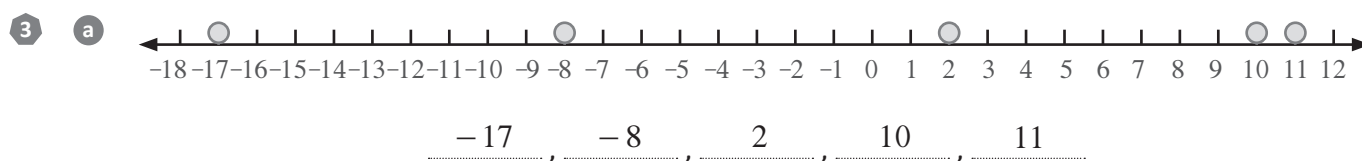
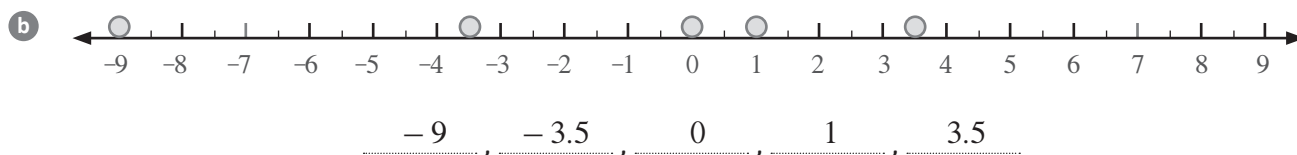
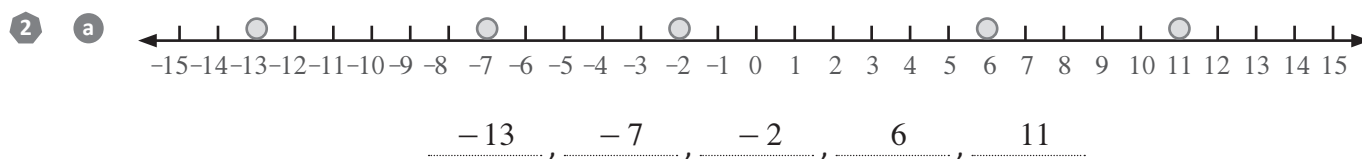
h $9\frac{1}{2} \boxed{<} 9.9$

i $-5.1 \boxed{>} -5.8$

j $-1.8 \boxed{<} 1.2$

k $-12.5 \boxed{>} -21.5$

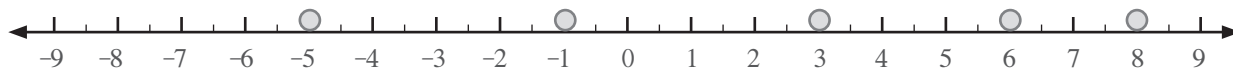
l $11\frac{1}{2} \boxed{>} 11\frac{1}{3}$



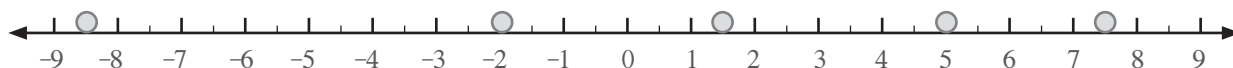
Page 13 questions

The Number Line

- 4 a $-5, 8, -1, 3, 6$.



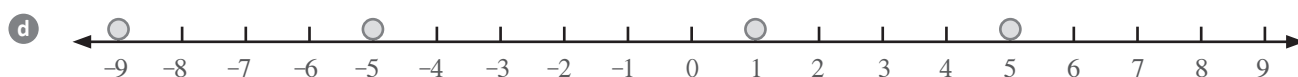
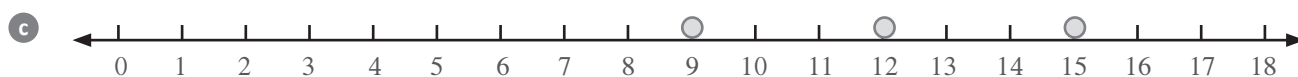
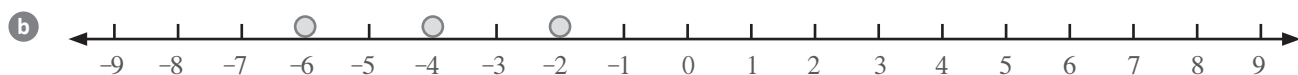
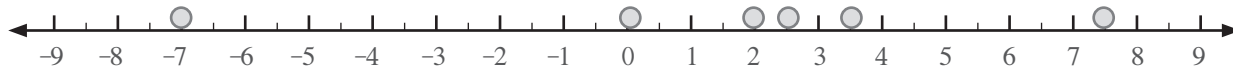
- b $-8.5, 1.5, -2, 7.5, 5$.



- c $-4\frac{1}{2}, 4, 6\frac{1}{2}, -\frac{1}{2}, 5$.

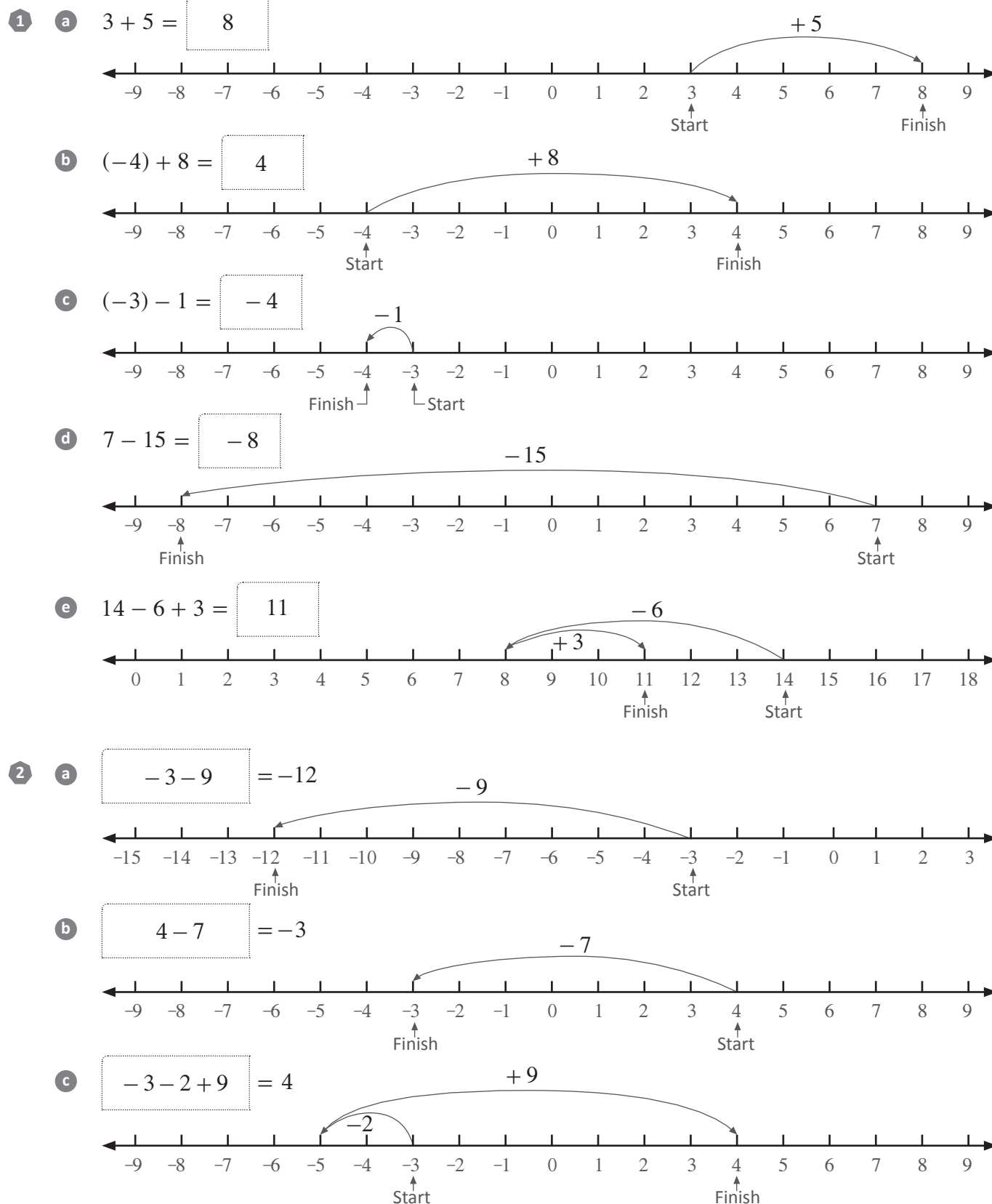


- d $-7, 7.5, 3\frac{1}{2}, 0, 2\frac{1}{2}, 2$.



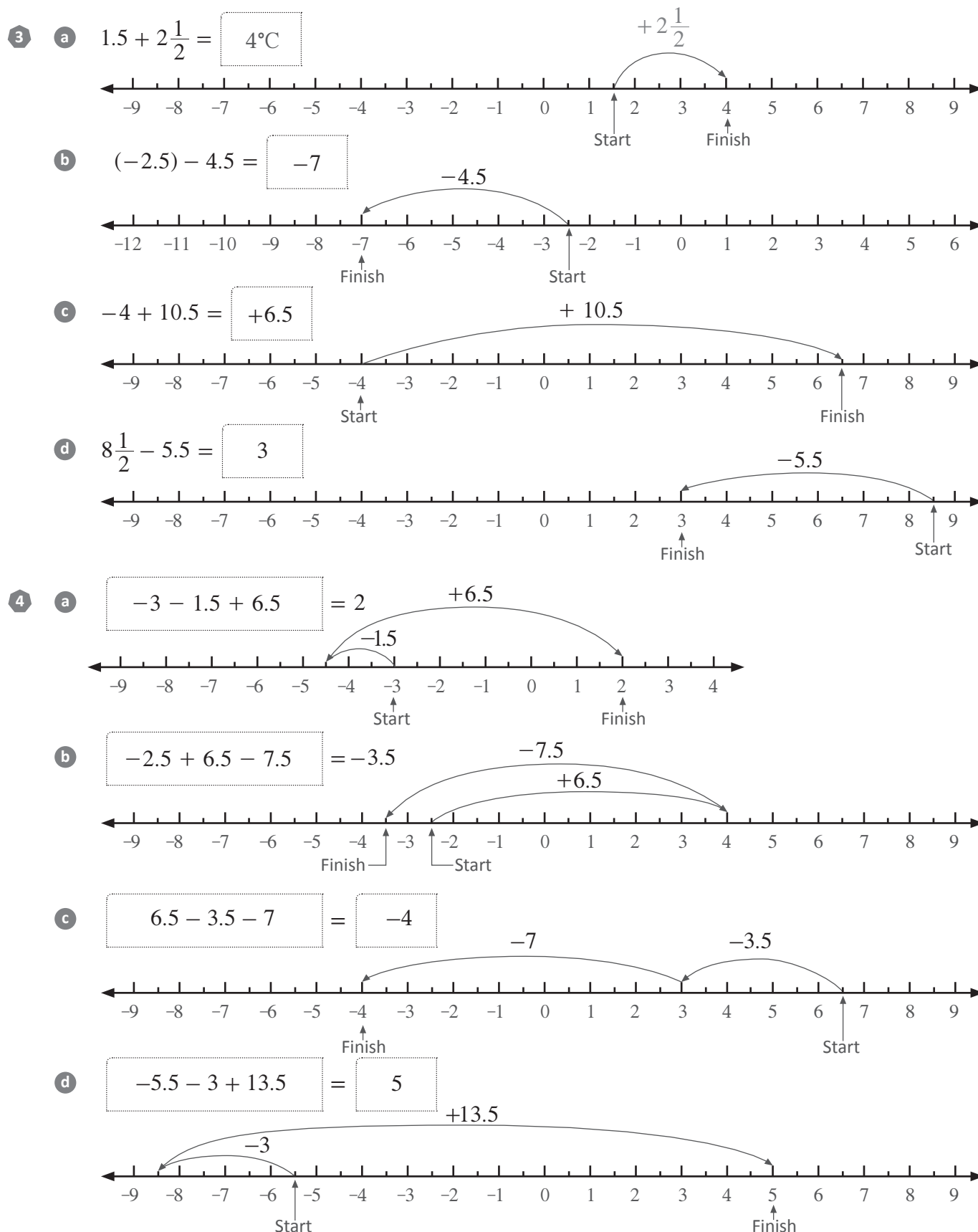
Page 15 questions

Addition and subtraction using a number line



Page 16 questions

Addition and subtraction using a number line



Page 18 questions

The mysterious Dr Thermos

- 1 a Laboratory temperature: $+2^{\circ}\text{C}$ b Laboratory temperature: -4°C
- c Laboratory temperature: $+5^{\circ}\text{C}$ d Laboratory temperature: -8°C
- 2 a 3 hot spheres added b 9 cold spheres added
- c 6 cold spheres added d 20 hot spheres added
- 3 a 7 hot spheres removed b 2 cold spheres removed
- c 5 hot spheres removed d 8 cold spheres removed

Page 19 questions

The mysterious Dr Thermos

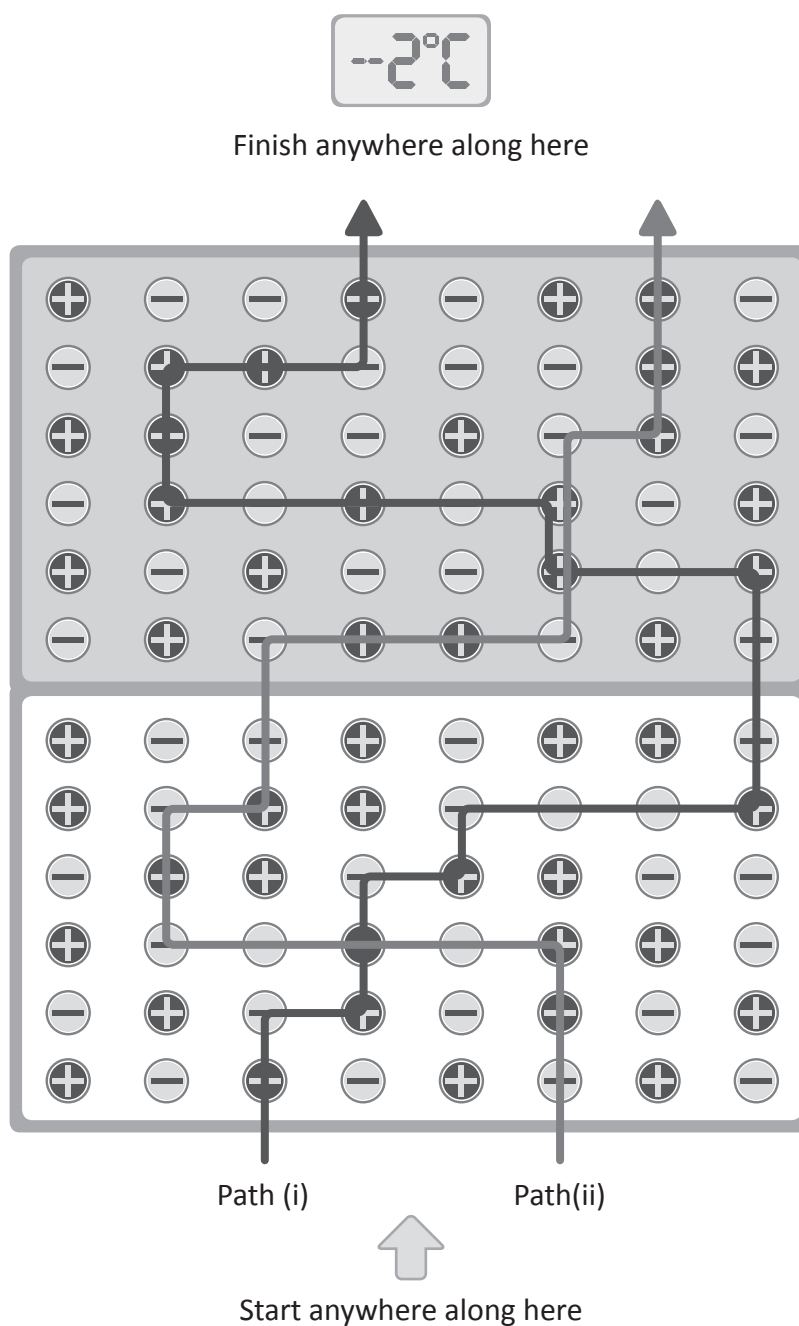
- 4 a (i) First way: Add four hot spheres (ii) Second way: Remove the four cold spheres
- b (i) First way: Add two cold spheres (ii) Second way: Remove two of the hot spheres
- 5 a (i) First way: Remove four of the cold spheres
OR
Remove all five of the cold spheres and add one of the spare hot spheres
- (ii) Second way: Remove three of the cold spheres and add both of the spare hot spheres
(using all spare spheres)
- b (i) First way: Remove five of the hot spheres
OR
Remove four of the hot spheres and add one of the spare cold spheres
- (ii) Second way: Remove three of the hot spheres and add both of the spare cold spheres
(using all spare spheres)

Page 20 questions

The mysterious Dr Thermos

Puzzle time!

- 6 (i) & (ii) Two possible paths:



Page 22 questions

Adding and subtracting directed numbers

Calculate these additions and subtractions of integers without a calculator.

- 1
- | | | | | | |
|---|-------------------|---|---------------------|---|--------------------|
| a | $-5 + 3 = -2$ | b | $-4 + 7 = 3$ | c | $-4 - 4 = -8$ |
| d | $-11 - 8 = -19$ | e | $1 - 16 = -15$ | f | $16 - 22 = -6$ |
| g | $6 + (-3) = 3$ | h | $30 + (-17) = 13$ | i | $0 + (-8) = -8$ |
| j | $-4 + (-5) = -9$ | k | $-10 + (-19) = -29$ | l | $13 - (-5) = 18$ |
| m | $20 - (-21) = 41$ | n | $-18 - (-6) = -12$ | o | $-15 - (-26) = 11$ |

- 2
- | | | | |
|---|------------------------|---|-------------------------|
| a | $4 - 8 + 2 = -2$ | b | $-9 + 6 - 8 = -11$ |
| c | $-3 + 4 - 8 - 7 = -14$ | d | $-7 + (-4) + 13 = 2$ |
| e | $2 - (-6) - 7 = 1$ | f | $5 + (-1) - (-14) = 18$ |

Page 23 questions

Adding and subtracting directed numbers

- 3
- | | | | | | |
|---|------------------------------|---|---|---|------------------------|
| a | $5.5 - 8 = -2.5$ | b | $-3 + 2.5 = -0.5$ | c | $-2 - 7.5 = -9.5$ |
| d | $-6\frac{1}{2} - 19 = -25.5$ | e | $9.5 - 16 = -6.5$ | f | $7.5 + (-18) = -10.5$ |
| g | $0.5 + (-5.5) = -5$ | h | $-12\frac{1}{2} - (-3\frac{1}{2}) = -9$ | i | $0 - (+8) - (-6) = -2$ |

Page 23 questions

Adding and subtracting directed numbers

4 **a** $-2 - 7 + 3.5 = -5.5$

b $1 + 0.5 - 6 = -4.5$

c $2 + (-3.5) + 1.5 = 0$

d $-7\frac{1}{2} + (-9) - (-2\frac{1}{2}) = -14$

e $-8.5 - (-6\frac{1}{2}) + 18 = 16$

f $-4 + (-4) - (-4\frac{1}{4}) - 4\frac{1}{4} = -8$

Page 24 questions

Adding and subtracting directed numbers

5 **a** $53 - 89 = -36$

b $-43 + 94 = 51$

c $34 + (-51) = -17$

d $-25 + (-94) = -119$

e $-94 - (-28) = -66$

f $-16 + (-87) - (-41) = -62$

g $-2.6 + 10.4 = 7.8$

h $-0.5 - 6.7 = -7.2$

i $-10.3 + (-5.6) = -15.9$

j $66 - 34.6 + (-24.4) = 7$

k $1.06 + 4.5 - 9.7 = -4.14$

l $-0.23 + 1.76 = 1.53$

m $(-71.23) + (-52.38) = -123.61$

n $-1.204 - (-5.093) = 3.889$

o $98.23 - (-13.8) - 112.3 = -0.27$

p $-29\frac{1}{3} + 51 = 21\frac{2}{3}$

q $-30\frac{1}{3} - (-66\frac{1}{2}) = 36\frac{1}{6}$

r $100 + (-54\frac{1}{2}) - 46\frac{1}{4} = -\frac{3}{4}$

Page 26 questions

Multiplying and dividing directed numbers

- 1
- a $3 \times (-7) = -21$ b $-6 \times 8 = -48$ c $-36 \div 12 = -3$
- d $48 \div (-4) = -12$ e $-16 \times (-1) = 16$ f $-2 \times (-2) = 4$
- g $-12 \div (-12) = 1$ h $21 \div (-21) = -1$ i $3 \times (-4) \div 6 = -12 \div 6 = -2$
- 2
- a $-24 \div 3 \div (-8) = -8 \div (-8) = 1$ b $-18 \div (-6) \times 4 = 3 \times 4 = 12$
- c $-5 \times 2 \times (-1) \times 2 = -10 \times (-1) \times 2 = 10 \times 2 = 20$ d $-5^2 = -(5 \times 5) = -25$
- e $(-4)^2 = (-4) \times (-4) = 16$ f $(-3)^3 = (-3) \times (-3) \times (-3) = -27$
- g $-2^3 = -(2 \times 2 \times 2) = -8$ h $(-2)^2 \div 4 = (-2) \times (-2) \div 4 = 4 \div 4 = 1$
- i $(-3)^2 \times -3 = (-3) \times (-3) \times (-3) = 9 \times (-3) = -27$ j $6^3 \div (-2) = 216 \div (-2) = -108$
- k $2^4 \div -4^2 = 16 \div (-16) = -1$ l $9^2 \div -3^2 \times (3) = 81 \div -3^2 \times (3) = 81 \div (-9) \times (3) = -9 \times 3 = -27$

Page 27 questions

Multiplying and dividing directed numbers

3 a $27 \times (-4) = -108$
 $27 \times (-4) =$

b $-21 \times 13 = -273$
 $(-21) \times 13 =$

c $-4 \times 29 = -116$
 $(-4) \times 29 =$

d $-95 \div (-19) = 5$
 $(-95) \div (-19) =$

e $125 \times (-49) = -6125$
 $125 \times (-49) =$

f $-162 \div 18 = -9$
 $(-162) \div 18 =$

g $-53 \times 16 = -848$
 $(-53) \times 16 =$

h $(-391) \div (-23) = 17$
 $(-391) \div (-23) =$

i $-15 \times 15 \div (-3) = -225 \div (-3)$
 $= 75$
 $(-15) \times 15 \div (-3) =$

4 a $-25 \times 13 \div (-65) = -325 \div (-65)$
 $= 5$

b $-500 \div (-5) \div 25 = 100 \div 25$
 $= 4$

c $-552 \div (-23) \times (-8) = 24 \times (-8)$
 $= -192$

d $2\frac{1}{2} \times (-6) \div 5 = -15 \div 5$
 $= -3$

e $12.5 \times 25 \div (-0.25) = 312.5 \div (-0.25)$
 $= -1250$

f $-1\frac{2}{5} \div (-14) \times 5 \times (-2) = 0.1 \times 5 \times (-2)$
 $= 0.5 \times (-2)$
 $= -1$

g $-4 \times 3.6 \times 22 \div 7.92 = -14.4 \times 22 \div 7.92$
 $= -316.8 \div 7.92$
 $= -40$

Page 27 questions

Multiplying and dividing directed numbers

$$\begin{aligned} \text{h } -3404.7 \div (-3.6) \div 1\frac{1}{2} \div 9.7 &= 945.75 \div 1\frac{1}{2} \div 9.7 \\ &= 630.5 \div 9.7 \\ &= 65 \end{aligned}$$

$$\begin{aligned} \text{i } 260 \div (-26) \times 2\frac{3}{5} \div 0.26 &= -10 \times 2\frac{3}{5} \div 0.26 \\ &= -26 \div 0.26 \\ &= -100 \end{aligned}$$

$$\text{j } (-7)^3 = -343$$

$$\text{k } -2^{10} = -1024$$

$$\text{l } (-8)^3 = -512$$

$$\text{m } (-9)^4 = 6561$$

$$((-)(-)(8))x^3 =$$

$$((-)(-)(9))x^4 =$$

$$\text{n } -(-6)^3 = 216$$

$$\text{o } -(-1.5)^5 = -7.59375 \text{ or } \frac{243}{32}$$

$$((-)((-)(6))x^3)3 =$$

$$((-)((-)(1.5))x^5)5 =$$

Page 29 questions

Combining the basic operations

$$\begin{aligned} \text{a } -4 + 16 \div 8 &= -4 + 2 \\ &= -2 \end{aligned}$$

$$\begin{aligned} \text{b } 6 \times (-8) - 12 &= -48 - 12 \\ &= -60 \end{aligned}$$

$$\begin{aligned} \text{c } 50 \div (-25) + 10 &= -2 + 10 \\ &= 8 \end{aligned}$$

$$\begin{aligned} \text{d } -8 - 5 \times 4 &= -8 - 20 \\ &= -28 \end{aligned}$$

$$\begin{aligned} \text{e } 5 + 7 \times (-6) &= 5 - 42 \\ &= -37 \end{aligned}$$

$$\begin{aligned} \text{f } -11 \times -2 + 18 &= 22 + 18 \\ &= 40 \end{aligned}$$

$$\begin{aligned} \text{g } 22 - 39 \div (-3) &= 22 + 13 \\ &= 35 \end{aligned}$$

$$\begin{aligned} \text{h } -10 - 4 \times 15 &= -10 - 60 \\ &= -70 \end{aligned}$$

Page 29 questions

Combining the basic operations

$$\begin{aligned} \text{2 a } 4 \times (-2) + 18 - 11 &= -8 + 18 - 11 \\ &= 10 - 11 \\ &= -1 \end{aligned}$$

$$\begin{aligned} \text{b } -3 \times 6 \div 9 + 3 &= -18 \div 9 + 3 \\ &= -2 + 3 \\ &= 1 \end{aligned}$$

$$\begin{aligned} \text{c } -9 + 48 \div (-12) + 13 &= -9 - 4 + 13 \\ &= -13 + 13 \\ &= 0 \end{aligned}$$

$$\begin{aligned} \text{d } 32 \div 4 - 3 \times (-4) &= 8 - 3 \times (-4) \\ &= 8 + 12 \\ &= 20 \end{aligned}$$

3 Use a calculator to simplify these combined operations:

$$\text{a } 28 \div (-4) + 13 \times 7 = 84$$

Calculator steps: **2 8 ÷ ((-) 4) + 1 3 x 7 =**

$$\text{b } 120 \div (-15) \times 24 - 8 = -200$$

Calculator steps: **1 2 0 ÷ ((-) 1 5) x 2 4 - 8 =**

$$\text{c } -25 \times 6 - 224 \div (-32) = -143$$

Calculator steps: **(-) 2 5 x 6 - 2 2 4 ÷ ((-) 3 2) =**

$$\text{d } 30 \times (-15) - 35 \div 4 \times (-16) = -310$$

Calculator steps: **3 0 x ((-) 1 5) - 3 5 ÷ 4 x ((-) 1 6) =**

Page 31 questions

Order of operations

$$\begin{aligned} 1 \quad a \quad (16 - 10) \times 4 &= 6 \times 4 \\ &= 24 \end{aligned}$$

$$\begin{aligned} b \quad 34 \div (6 + (-8)) &= 34 \div (-2) \\ &= -17 \end{aligned}$$

$$\begin{aligned} c \quad -5 \times (27 \div 9) &= -5 \times 3 \\ &= -15 \end{aligned}$$

$$\begin{aligned} d \quad (-13 - (-19)) \times 3 &= 6 \times 3 \\ &= 18 \end{aligned}$$

$$\begin{aligned} e \quad -5 \times (14 - 9) - 5 &= -5 \times 5 - 5 \\ &= -25 - 5 \\ &= -30 \end{aligned}$$

$$\begin{aligned} f \quad 4 \times (36 \div 2) - (-4) &= 4 \times 18 + 4 \\ &= 72 + 4 \\ &= 76 \end{aligned}$$

$$\begin{aligned} g \quad 18 + (16 \div 4 + 10) &= 18 + (4 + 10) \\ &= 18 + 14 \\ &= 32 \end{aligned}$$

$$\begin{aligned} h \quad (18 \div 2 - (-4)) - 7 &= (9 - (-4)) - 7 \\ &= 13 - 7 \\ &= 6 \end{aligned}$$

$$\begin{aligned} 2 \quad a \quad (-2)^2 \div (-2) &= 4 \div (-2) \\ &= -2 \end{aligned}$$

$$\begin{aligned} b \quad (-7 - 5) \times (-1)^3 &= -12 \times (-1) \\ &= 12 \end{aligned}$$

$$\begin{aligned} c \quad (8 - 14)^2 - 16 &= (-6)^2 - 16 \\ &= 36 - 16 \\ &= 20 \end{aligned}$$

$$\begin{aligned} d \quad (3^3 - 43) \div 8 &= (27 - 43) \div 8 \\ &= -16 \div 8 \\ &= -2 \end{aligned}$$

Page 32 questions

Order of operations

$$\begin{aligned} 3 \quad a \quad 26 \div (14 + 2 \times 6) + (-1)^2 &= 26 \div (14 + 12) + (-1)^2 \\ &= 26 \div 26 + 1 \\ &= 1 + 1 \\ &= 2 \end{aligned}$$

$$\begin{aligned} b \quad -100 \times (12 - 32 \div (-4)) \div 40 &= -100 \times (12 - (-8)) \div 40 \\ &= -100 \times 20 \div 40 \\ &= -2000 \div 40 \\ &= -50 \end{aligned}$$

Page 32 questions

Order of operations

$$\begin{aligned}
 \text{3 c } (11 \times 2^3 - 10) \div 39 + 8 &= (11 \times 8 - 10) \div 39 + 8 \\
 &= (88 - 10) \div 39 + 8 \\
 &= 78 \div 39 + 8 \\
 &= 2 + 8 \\
 &= 10
 \end{aligned}$$

$$\begin{aligned}
 \text{d } 9 \times ((-8) - 8 \div 4 + 16) - 4^3 &= 9 \times ((-8) - 2 + 16) - 4^3 \\
 &= 9 \times (-10 + 16) - 4^3 \\
 &= 9 \times 6 - 4^3 \\
 &= 9 \times 6 - 64 \\
 &= 54 - 64 \\
 &= -10
 \end{aligned}$$

$$\begin{aligned}
 \text{e } 200 \div (-4) \times (-3) \div (16 - 14 \times (-1)^3) &= 200 \div (-4) \times (-3) \div (16 - 14 \times (-1)) \\
 &= 200 \div (-4) \times (-3) \div (16 + 14) \\
 &= 200 \div (-4) \times (-3) \div 30 \\
 &= -50 \times (-3) \div 30 \\
 &= 150 \div 30 \\
 &= 5
 \end{aligned}$$

Page 34 questions

Order of operations with grouping symbols

$$\begin{aligned}
 \text{1 a } (16 + 9) + (14 - 7) &= 25 + 7 \\
 &= 32
 \end{aligned}$$

$$\begin{aligned}
 \text{b } (1 - 9) - (3 - 8) &= -8 - (-5) \\
 &= -8 + 5 \\
 &= -3
 \end{aligned}$$

$$\begin{aligned}
 \text{c } (7 - 11) \times (4 + 2) &= -4 \times 6 \\
 &= -24
 \end{aligned}$$

$$\begin{aligned}
 \text{d } (18 - 3) \div (-12 - (-7)) &= 15 \div (-12 + 7) \\
 &= 15 \div (-5) \\
 &= -3
 \end{aligned}$$

$$\begin{aligned}
 \text{e } \frac{46 - 19}{5 - 2} &= (46 - 19) \div (5 - 2) \\
 &= 27 \div 3 \\
 &= 9
 \end{aligned}$$

$$\begin{aligned}
 \text{f } \frac{-2 \times 10}{48 \div 12} &= (-2 \times 10) \div (48 \div 12) \\
 &= -20 \div 4 \\
 &= -5
 \end{aligned}$$

Page 34 questions

Order of operations with grouping symbols

$$\begin{aligned}
 \text{1 g } (50 + 54 \div 9) \div (-24 \div 3) &= (50 + 6) \div (-8) \\
 &= 56 \div (-8) \\
 &= -7
 \end{aligned}$$

$$\begin{aligned}
 \text{h } \frac{8 \times 5 - 12}{42 \div (-6)} &= (8 \times 5 - 12) \div (42 \div (-6)) \\
 &= (40 - 12) \div (-7) \\
 &= 28 \div (-7) \\
 &= -4
 \end{aligned}$$

$$\begin{aligned}
 \text{2 a } -12 \div [(7 + 11) \div 9] &= -12 \div [18 \div 9] \\
 &= -12 \div 2 \\
 &= -6
 \end{aligned}$$

$$\begin{aligned}
 \text{b } [10 + (-14 \div 2)] \times 8 &= [10 + (-7)] \times 8 \\
 &= 3 \times 8 \\
 &= 24
 \end{aligned}$$

$$\begin{aligned}
 \text{c } [-6 \times (13 - (-7))] \div 4 &= [-6 \times (20)] \div 4 \\
 &= -120 \div 4 \\
 &= -30
 \end{aligned}$$

$$\begin{aligned}
 \text{d } 5 \times [(2^2 - 9) \times 3] &= 5 \times [(4 - 9) \times 3] \\
 &= 5 \times [-5 \times 3] \\
 &= 5 \times [-15] \\
 &= -75
 \end{aligned}$$

Page 35 questions

Order of operations with grouping symbols

$$\begin{aligned}
 \text{3 a } \{[12 + (6 \times 8)] \div 3\} - 25 &= \{[12 + 48] \div 3\} - 25 \\
 &= \{60 \div 3\} - 25 \\
 &= 20 - 25 \\
 &= -5
 \end{aligned}$$

$$\begin{aligned}
 \text{b } (-2)^3 + \{-2 + [2 \times (2 + 2)]\} &= (-2)^3 + \{-2 + [2 \times 4]\} \\
 &= (-2)^3 + \{-2 + 8\} \\
 &= (-2)^3 + 6 \\
 &= -8 + 6 \\
 &= -2
 \end{aligned}$$

Page 35 questions

Order of operations with grouping symbols

$$\begin{aligned}
 \text{4 a } \frac{(14-8)^2 \times (-1)^3}{15-(-3)} &= [(14-8)^2 \times (-1)^3] \div [15-(-3)] \\
 &= [(6)^2 \times (-1)^3] \div [15-(-3)] \\
 &= [36 \times (-1)] \div [15+3] \\
 &= -36 \div 18 \\
 &= -2
 \end{aligned}$$

$$\begin{aligned}
 \text{b } -4 \times \{(-72 + (-6)^2) \div [(4 \times (-5)) - (-2)]\} &= -4 \times \{(-72 + 36) \div [(4 \times (-5)) - (-2)]\} \\
 &= -4 \times \{(-36) \div [-20 - (-2)]\} \\
 &= -4 \times \{-36 \div [-20 + 2]\} \\
 &= -4 \times \{-36 \div [-18]\} \\
 &= -4 \times 2 \\
 &= -8
 \end{aligned}$$

$$\begin{aligned}
 \text{c } -3 \times \{[(-3 - (-3))^2 + (-3)^2] \div 3 \times (-3)\} &= -3 \times \{[(-3 + 3)^2 + (-3)^2] \div 3 \times (-3)\} \\
 &= -3 \times \{[(0)^2 + (-3)^2] \div 3 \times (-3)\} \\
 &= -3 \times \{[9] \div 3 \times (-3)\} \\
 &= -3 \times \{3 \times (-3)\} \\
 &= -3 \times \{-9\} \\
 &= 27
 \end{aligned}$$



www.mathletics.com